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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Tatsutoshi ABE et al.

Application No.: 10/650,236 Confirmation No.: 6413

Filed: August 28, 2003 Group Art Unit: 2451

For: COMMAND SYNCHRONIZATION ESTABLISHMENT SYSTEM Examiner: Maceeh Anwari

APPEAL BRIEF

MS Appeal Brief - Patents
Attn: Technology Center AU 2614
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

This is an appeal from the final Office Action dated March 15, 2010 (the "Office Action") rejecting claims 1-2 and 4-10 of the above-identified patent application. A Notice of Appeal was filed on September 15, 2010. Thus, as required under 37 C.F.R. § 41.37, this Brief is filed within two months of the filing of the Notice of Appeal. The fees required under § 41.20(b)(2) are submitted concurrently herewith. This Brief contains items under the following headings as required by § 41.37 and MPEP 1206:

I. Real Party in Interest
II. Related Appeals and Interferences
III. Status of Claims
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V. Summary of Claimed Subject Matter
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I. REAL PARTY IN INTEREST

The real party in interest for this appeal is the assignee of record, Yamaha Corporation with a principal place of business at 10-1 Nakazawa-cho, Naka-ku, Hamamatsu 430-8650, Japan.

II. RELATED APPEALS AND INTERFERENCES

There are no other appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

A. Current Status of Claims

Claims cancelled: 3

Claims pending: 1-2 and 4-10

Claims withdrawn from consideration but not cancelled: none

Claims confirmed: none

Claims rejected: 1-2 and 4-10

B. Claims on Appeal

The claims on appeal are claims 1-2 and 4-10.

IV. STATUS OF AMENDMENTS

Subsequent to the final Office Action, the Applicant filed no amendment to the pending claims 1-2 and 4-10 as listed in the Claims Appendix.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention, as set forth in independent claims 1, 2, and 7-10, is directed to a command synchronization system and related methods and apparatus. Particularly, the system includes a network with different nodes, one of which is a cycle master node. The cycle master node periodically transmits a cycle start packet to each node on the network so that each node synchronizes its clock in accordance with the time information included in the cycle start packet, thereby resulting in a shared clock. (*See, e.g.*, page 7, line 5 to page 8, line 1 of the application)

The system also comprises a controller as a node connected to the network. The controller transmits a command including a time-stamp based on the shared clock to a target apparatus via an asynchronous transfer. (*See, e.g.*, page 8, lines 2-12 of the application)

The target apparatus in the system is another node connected to the network, which comprises a receiver that receives the command. The target apparatus also includes a storage device that temporally stores the received command and a transmitter that transmits to the controller an interim response that the received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command. An executing device in the target apparatus executes the received command, and a replying device provides a complete response indicating that the execution of the received command is completed. (*See, e.g.*, page 8, line 21 to page 9, line 8 of the application; Fig. 3B)

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The ground of rejection on appeal is:

Whether claims 1-2 and 4-10 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 6,148,051 to Fujimori *et al.* (Fujimori) in view of U.S. Patent Application Publication No. 2002/0064185 A1 to Nakai *et al.* (Nakai).

VII. ARGUMENT

A. Claim 1

As described above, the command synchronization system under the present invention requires transmission of two responses, *i.e.*, an interim response and a complete response, in response to a command with a time-stamp transferred during an asynchronous transfer. By transmitting two responses, the present invention can make the use of "a command with time stamp" more effective. Otherwise, without receiving any interim response from the target apparatus, the controller, while sequentially transmitting a plurality of commands including time stamps, will have to stop transmitting the next command and wait until after the previous one has been executed. This may cause significant delays in transmitting time-stamped commands.

Specifically, claim 1 recites "a transmitter that transmits *an interim response* to the controller reflecting that the received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command" as well as "a replying device that provides *a complete response* indicating completion of executing the command." (Emphasis added.) Applicants respectfully submit that Fujimori and Nakai, whether individually or in combination, fail to disclose or suggest at least the two-response limitation in claim 1.

a. Fujimori

Fujimori is directed to a synchronous data transfer system such as illustrated in Fig. 2. The system includes a transmitting node 10, a receiving node 20 and a master node 30. The master node 30 produces a cycle start packet in the form of a synchronization signal as disclosed in col. 4, lines 53-55. The transmitting node 10 then transmits a data train 9 to the receiving node 20. Fujimori discloses that the frequencies of the internal clock oscillators may deviate, and thus discloses an interface at the receiving node for correctly restoring the original data based on the synchronization. (*See, e.g.*, col. 5, line 53 to col. 7, line 43) However, there is no disclosure in Fujimori of the receiving node transmitting an interim response to a controller "reflecting that the

received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command." Nor is there any disclosure in Fujimori of having "a replying device that provides a complete response indicating completion of executing the command."

The Examiner initially cited Figs. 1-6 and the Abstract of Fujimori as disclosing the claimed interim response. However, Applicants do not find in the cited sections any disclosure or suggestion of "an interim response ... reflecting that the received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command." Then the Examiner relied upon the synchronization signals in Fujimori as corresponding to the interim response, contending that synchronizing the internal time data of the nodes to a reference time data constitutes a response to a command. Applicants respectfully disagree. Fujimori's synchronization signal is only a signal representing a reference time and not a response to a command having a time-stamp. Even if the synchronization signals were interpreted as a response in broad terms, these signals are distinct from the recited interim response because they do not indicate or reflect "that the received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command."

Accordingly, Applicants respectfully submit that Fujimori fails to disclose or suggest at least the two-response limitation in claim 1.

b. Nakai

Nakai is directed to a system measuring a transfer delay time for defining cycle time synchronization so as to provide an isochronous transfer with high precision. It is respectfully submitted that Nakai does not cure the deficiencies of Fujimori by providing any disclosure or suggestion of the two-response recitation in claim 1.

The Examiner cited Figs. 18 and 24 and paragraphs [0152]-[0153] of Nakai as teaching the above two-response limitation. However, Fig. 18 only shows how to use a time stamp to

synchronize a request node N1 and a response node N2. Paragraphs [0152]-[0153] provide no more relevant disclosure than that the response node N2 receives a command with a time stamp therein from the request node N1 and executes the command at the time indicated by the time stamp. There is no disclosure of transmitting the complete response. Furthermore, Fig. 24 only shows that the data packets D3 and D4 are transmitted by an asynchronous transmission, and the acknowledge packets DA is returned. The acknowledge packet is also different from the recited complete response because it does not indicate completion of executing the command. Accordingly, Nakai fails to teach or suggest the two-response limitation in claim 1.

In addition, contrary to the Examiner's assertion, the "read response" in Figs. 2 and 5 of Nakai does not teach or suggest the recited complete response. As known in the art, a read command is generally a type of command to be executed instantly. This means, there is no need or time margin for Nakai to return an interim response "reflecting that the received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command." As such, Nakai teaches away having two responses, namely, an interim response and a complete response. Indeed, Applicants wish to stress the point that the response node in Nakai transmits only one response, as opposed to two separate responses in the present invention.

In light of the above, Applicants respectfully submit that Fujimori and Nakai, whether alone or in combination, fail to disclose or suggest every limitation of claim 1. Thus, claim 1 is patentable over Fujimori and Nakai.

B. Claim 2

Similar to claim 1, claim 2 recites an interim response and a complete response. Applicants respectfully submit that claim 2 is patentable over Fujimori and Nakai for at least the reasons set forth above with respect to claim 1.

C. Claims 4-6

Claims 4-6 depend from claim 1. Applicants respectfully submit that claims 4-6 are patentable over Fujimori and Nakai for at least the reasons set forth above with respect to claim 1.

D. Claim 7

Claim 7 is directed to a command synchronization establishment method, which, similar to claim 1, includes the two-response limitation. Applicants respectfully submit that claim 7 is patentable over Fujimori and Nakai for at least the reasons set forth above with respect to claim 1.

E. Claim 8

Claim 8 is directed to a controller for a command synchronization establishment system. Similar to claim 1, claim 8 also recites the interim and complete responses. Accordingly, Applicants respectfully submit that claim 9 is patentable over Fujimori and Nakai.

F. Claim 9

Claim 9 is directed to a target apparatus, also containing the two-response recitation. Accordingly, claim 9 is patentable over Fujimori and Nakai for at least the same reasons as applied to claim 1.

G. Claim 10

Claim 10 is directed to a command synchronization system having similar two-response limitations. Applicants respectfully submit that claim 10 is patentable over Fujimori and Nakai for at least the reasons set forth above with respect to claim 1.

VIII. CLAIMS APPENDIX

A copy of the claims involved in the present appeal is provided hereto.

IX. EVIDENCE APPENDIX

No evidence pursuant to §§ 1.130, 1.131 and 1.132 or entered by or relied upon by the Examiner is being submitted.

X. RELATED PROCEEDINGS APPENDIX

Because no related proceedings are referenced in section II above, no copies of decisions in the related proceedings are provided, no Related Proceedings Appendix is included.

Respectfully submitted,

Date: November 12, 2010

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CLAIMS APPENDIX

Claims 1-2 and 4-10 involved in this appeal:

Claim 1 (previously presented): A command synchronization establishment system comprising:

a network wherein a cycle master node managing time on the network periodically transmits a cycle start packet including time information to each node connected to the network, each node synchronizes its clock in accordance with the time information included in the cycle start packet so as to assure isochronism on the network by sharing the synchronized clock with each other node, data is periodically transferred by an isochronous transfer following the cycle start packet, and a command is transferred by an asynchronous transfer using a time period after the isochronous transfer until the next cycle start packet;

a controller as a node connected to the network, comprising a transmitter that transmits a command including a time-stamp based on the synchronized clock to a target apparatus by using the asynchronous transfer; and

the target apparatus as another node connected to the network, comprising a receiver that receives the command, a storage device that temporally stores the received command in order not to execute the received command instantly, a transmitter that transmits an interim response to the controller reflecting that the received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command, an executing device that executes the received command when the current time based on the synchronized clock reaches the time represented by the time-stamp included in the command, and a replying device that provides a complete response indicating completion of executing the command.

Claim 2 (previously presented): A command synchronization establishment system comprising:

a network wherein a cycle master node managing time on the network periodically transmits a cycle start packet including time information to each node connected to the network, each node synchronizes its clock in accordance with the time information included in the cycle start packet so as to assure isochronism on the network by sharing the synchronized clock with each other node,

data is periodically transferred by an isochronous transfer following the cycle start packet, and a command is transferred by an asynchronous transfer using a time period after the isochronous transfer until the next cycle start packet;

a controller as a node connected to the network, comprising a transmitter that transmits a command including a time-stamp based on the synchronized clock to a target apparatus by using the asynchronous transfer; and

the target apparatus as another node connected to the network, comprising a receiver that receives the command, a storage device that temporally stores the received command in order not to execute the received command instantly, a transmitter that transmits an interim response to the controller reflecting that the received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command, and an executing device that executes the received command before the current time based on the synchronized clock reaches the time represented by the time-stamp included in the command and validates a result of the execution of the received command when the current time based on the synchronized clock reaches the time represented by the time-stamp.

Claim 3 (canceled)

Claim 4 (previously presented): A command synchronization establishment system according to claim 1, wherein said each node connected to the network shares the synchronized clock with each other node by copying the time information included in the cycle start packet to a cycle time register in each node, and

said time-stamp included in the command is in a format including a part or all formats of the cycle time register.

Claim 5 (previously presented): A command synchronization establishment system according to claim 1, wherein said command includes a flag instructing the executing device to execute the command instantly or when the current time reaches the time represented by the time-stamp included in the command, and the target apparatus determines whether to execute the

received command instantly or when the current time reaches the time represented by the time-stamp in accordance with the flag.

Claim 6 (original): A command synchronization establishment system according to claim 5, wherein the flag uses a part of a format of the time-stamp included in the command.

Claim 7 (previously presented): A command synchronization establishment method using a network wherein a cycle master node managing time on the network periodically transmits a cycle start packet including time information to each node connected to the network, each node synchronizes its clock in accordance with the time information included in the cycle start packet so as to assure isochronism on the network by sharing the synchronized clock with each other node, data is periodically transferred by an isochronous transfer following the cycle start packet, and a command is transferred by an asynchronous transfer using a time period after the isochronous transfer until the next cycle start packet, the method comprising the steps of:

transmitting a command including a time-stamp based on the synchronized clock to a target apparatus by using the asynchronous transfer from a controller as a node connected to the network;

receiving the command by the target apparatus as another node connected to the network;

temporally storing the received command in order not to execute the received command instantly;

transmitting an interim response to the controller reflecting that the received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command;

executing the received command when the current time based on the synchronized clock reaches the time represented by the time-stamp included in the command; and

providing a complete response indicating completion of executing the command.

Claim 8 (previously presented): A controller for a command synchronization establishment system connected as a node to a network to which a target apparatus is connected as another node, said target apparatus comprising a receiver that receives the command, a storage device that

temporally stores the received command in order not to execute the received command instantly, a transmitter that transmits an interim response to the controller reflecting that the received command will be executed when a current time based on a synchronized clock reaches a time represented by a time-stamp included in the command, an executing device that executes the received command when the current time based on the synchronized clock reaches the time represented by the time-stamp included in the command, and a replying device that provides a complete response indicating completion of executing the command, and wherein a cycle master node managing time on the network periodically transmits a cycle start packet including time information to each node connected to the network, each node synchronizes its clock in accordance with the time information included in the cycle start packet so as to assure isochronism on the network by sharing the synchronized clock with each other node, data is periodically transferred by an isochronous transfer following the cycle start packet, and a command is transferred by an asynchronous transfer using a time period after the isochronous transfer until the next cycle start packet; the controller comprising:

a transmitter that transmits a command including a time-stamp based on the synchronized clock to the target apparatus by using the asynchronous transfer; and

a receiver that receives the interim response reflecting that the received command will be executed when the current time based on a shared clock reaches a time represented by a time-stamp included in the command and that receives the complete response indicating completion of executing the command.

Claim 9 (previously presented): A target apparatus for a command synchronization establishment system using a network to which a controller comprising a transmitter that transmits a command including a time-stamp based on a synchronized clock to the target apparatus by using the asynchronous transfer is connected as a node, and wherein a cycle master node managing time on the network periodically transmits a cycle start packet including time information to each node connected to the network, each node synchronizes its clock in accordance with the time information included in the cycle start packet so as to assure isochronism on the network by sharing the synchronized clock with each other node, data is periodically transferred by an isochronous transfer following the cycle start packet, and a command is transferred by a asynchronous transfer using a

time period after the isochronous transfer until the next cycle start packet, the target apparatus as another node connected to the network comprising:

a receiver that receives the command;

a storage device that temporally stores the received command in order not to execute the received command instantly;

a transmitter that transmits an interim response representing to the controller reflecting that the received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command;

an executing device that executes the received command when the current time based on the synchronized clock reaches the time represented by the time-stamp included in the command; and

a replying device that provides a complete response indicating completion of executing the command.

Claim 10 (previously presented): A command synchronization system, comprising:

means for networking nodes wherein a cycle master node managing time on the network periodically notifies a cycle start packet including time information to each node connected to the network, each node synchronizes its clock in accordance with the time information included in the cycle start packet so as to assure isochronism on the network by sharing the synchronized clock with each other node, data is periodically transferred by an isochronous transfer following the cycle start packet, and a command is transferred by an asynchronous transfer using a time period after the isochronous transfer until the next cycle start packet;

means for transmitting a command including a time-stamp based on the synchronized clock to a target apparatus by using the asynchronous transfer from a controller connected to the network as a node;

means for receiving the command by the target apparatus connected to the network as another node;

means for temporally storing the received command in order not to execute the received command instantly;

means for transmitting an interim response to the controller reflecting that the received command will be executed when a current time based on the synchronized clock reaches a time represented by the time-stamp included in the command;

means for executing the received command when the current time based on the synchronized clock reaches the time represented by the time-stamp included in the command; and

means for providing a complete response indicating completion of executing the command.